

Kapilow 1999-0096

IN THE CLAIMS:

1 – 18. (Canceled)

19. (Currently Amended) [The apparatus of claim 17, wherein] An apparatus of performing Frame Erasure Concealment (FEC) for a speech coder that does not have FEC capability, comprising:

a lost frame detector that receives encoded frames of compressed speech information transmitted from an encoder and determines if an encoded frame is missing, lost or corrupted in transmission;

a decoder that decodes the received encoded frames into decoded frames if the lost frame detector determines that the encoded frame is not erased;

an FEC module that generates a synthetic frame for the erased frame using data of previously decoded frames if the lost frame detector determines that the encoded frame is erased;

a first memory that is updated with data of the decoded and synthetic frames;
and

an output device that outputs the decoded synthetic frames as audio signals
wherein:

at the first erased frame in a sequence of one or more erased frames, the FEC module estimates pitch period of the erased frame, copies one or more most recent pitch periods from the first memory to a second memory, copies a portion of most recent pitch period from the first memory to a third memory, overlap adds the portion of the pitch period stored in the third memory with a portion of the frames stored in the second memory, stores the overlap added portion of the pitch period in the most recent portion of the pitch period stored in the second memory, generates a synthetic frame based on one or more of the most recent pitch period stored in the second memory, for updating the first memory and outputting using the output device, and stored the last location used in the second memory as an offset pointer.

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20. (Original) The apparatus of claim 19, wherein the FEC module updates the delay memory with the overlap added portion.

21 - 25. (Canceled).

26. (Currently Amended) [The apparatus of claim 25,] An apparatus of performing Frame Erasure Concealment (FEC) for a speech coder that does not have FEC capability, comprising:

a lost frame detector that receives encoded frames of compressed speech information transmitted from an encoder and determines if an encoded frame is missing, lost or corrupted in transmission;

a decoder that decodes the received encoded frames into decoded frames if the lost frame detector determines that the encoded frame is not erased;

an FEC module that generates a synthetic frame for the erased frame using data of previously decoded frames if the lost frame detector determines that the encoded frame is erased;

a first memory that is updated with data of the decoded and synthetic frames;

and

an output device that outputs the decoded synthetic frames as audio signals

wherein:

the lost frame detector determines if one or more subsequently encoded frames are erased after a synthetic frame is output;

if the subsequently encoded frames are not erased, the FEC module processes a first non-erased encoded frame using an FEC process; and

the FEC module generates a synthetic frame's worth of data by copying data from the second memory to a fifth memory, determines if the missing frames exceed a predetermined length, attenuate,, the fifth memory based on the length of the erasure if the missing frames are! determined to exceed a predetermined length, overlap adds a portion of the fifth memory with the start of the first non-erased decoded frame and stores the result in the fifth memory, copies the non-overlap

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added region of the decoded frame to the fifth memory, the fifth memory being used for updating the first memory and outputting using the output device.

27 – 29. (Canceled).

30. (Original) The apparatus of claim 19, wherein the FEC module uses autocorrelation for the pitch period estimate if the decoder does not maintain a pitch estimate, and the decoder's pitch estimate is used if the decoder does maintain a pitch estimate.

31. (Original) The apparatus of claim 26, wherein a length of the overlap added increases with the length of the missing frames.

32. (Canceled).